

# NAVAL MEDICAL RESEARCH AND DEVELOPMENT NEWS

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## *In this issue...*

<a href="#">CO's Messages</a>	2
<a href="#">Consortium on Servicewomen</a>	3
<a href="#">Dayton Change of Command</a>	4
<a href="#">Undersea Medicine Exchange</a>	5
<a href="#">Rear Adm. Moulton Tours NHRC</a>	6
<a href="#">Spatial Disorientation Training</a>	7
<a href="#">NMRC Researcher Speaks at NIST</a>	8
<a href="#">Investment in Acute Trauma Care</a>	9
<a href="#">A Tribute: Purnomo Projodipuro</a>	9
<a href="#">Color Vision Deficiency</a>	10
<a href="#">NMRC Salutes NAMRU-3</a>	12
<a href="#">Ombudsman's Note</a>	12

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## NRL Scientists Fight Antibiotic-Resistant Diseases with Testing at NAMRU-2

*From NRL Public Affairs*

WASHINGTON - Before sailors and soldiers deploy to locations around the world, they need to know the kinds of infectious diseases they might encounter, especially those that are resistant to antibiotics. As part of ongoing research in this field, Drs. Gary Vora, Tomasz Leski and Chris Taitt of the U.S. Naval Research Laboratory's (NRL) Center for Bio/Molecular Science and Engineering joined with researchers from the Naval Medical Research Unit No. 2 (**NAMRU-2**) to conduct on-site testing of the NRL-developed Antimicrobial Resistance Determinant Microarray (ARDM).

The joint NRL-NAMRU-2 team successfully carried out testing and technology transition of the ARDM at

the NAMRU-2 satellite laboratory at the National Institutes of Public Health in Phnom Penh, Cambodia. This was the first time the technology had been tested outside of the NRL laboratory setting.

Vora, Leski and Taitt developed the ARDM to provide simultaneous DNA-based analysis for hundreds of resistance genes. This array works quickly to determine resistant genetic assemblages and also to monitor the spread and evolution of antibiotic resistance.

During the tests in Cambodia in June, Taitt and NAMRU-2's Lt. Cmdr. Michael Prouty used the ARDM to test more than 50 drug-resistant pathogens and wound isolates, including the methicillin-resistant *Staphylococcus aureus* (MRSA).

*(Continued on page 11)*



NRL's Dr. Chris Taitt (white lab coat) works with the staff at NAMRU-2 in Phnom Penh, Cambodia. Photo by Lt. Cmdr. Michael Prouty.

## NMRC Commanding Officer's Message

"Il n'est pas certain que tout soit incertain." (*Translation: It is not certain that everything is uncertain*, Blaise Pascal, 1623 – 1662, a French mathematician, physicist, inventor, writer and philosopher.)

In these uncertain times of the past furloughs, continuing sequestration efforts, and the pending FY14 budget issues, it is certain that the work of research will continue. The consequences of uncertainty have the potential to stall productivity as we wait for resolutions before deciding what to do and what direction to move toward. Change can cause a temporary pause – time to take a deep breath and consider possible outcomes.

As an Enterprise, NMRC has experienced much over the last few months, from the expected to the unexpected. There have been the Changes of Command at the Naval Health Research Center and the Naval Medical Research Unit – Dayton, and the evacuation of NAMRU-3, with many of the military researchers now here at NMRC while their Egyptian counterparts keep the work at the laboratory in Cairo moving forward. The new Defense Health Agency (DHA) is something we are all learning about. DHA is the centerpiece of Military Health System governance reform, and the implementation will include extensive transition actions during FY13 and beyond, with initial operating capability taking place October 1, 2013, and full operating capability within two years.

I can't predict the future, but I can tell you with certainty the Enterprise team is known for innovations that move research forward. We have shown our adaptability during these very interesting and challenging times as we turn our research into products for the warfighter and the World. We need to stay focused on our mission – these other things will work themselves out over time.

NMRC Commanding Officer sends,  
John W. Sanders III, CAPT, MC, USN



## NAMRU-3 Commanding Officer's Message

In 1967, diplomatic relations between Egypt and the U.S. were suspended over the war between Egypt and Israel. In spite of the fact that all U.S. staff were evacuated, the embassy closed, and a formal break in diplomatic relations, NAMRU-3 continued operations. The Americans returned in 1974.

In 2011, NAMRU-3 witnessed an ordered departure due to unrest surrounding the revolution in Egypt that toppled Egyptian president Hosni Mubarak. Capt. Wilkening, NAMRU-3 commanding officer, and I as the executive officer worked out an interim organization chart with the locally employed staff (LES) stepping up and capably continuing the research.

In August 2013, NAMRU-3 underwent another ordered departure due to political unrest following the removal of President Mohamed Morsy. Seven essential U.S. staff are currently maintaining full operations. Once again, I issued an interim organization chart, naming LES to head many of the research and administrative programs. Capt. Fred Landro, executive officer, was the first to return and is again managing the daily operations of the command, working with Egyptian researchers and Administration Directorate staff to keep NAMRU-3 productive and safe. Egyptian LES conduct research and training and travel to countries in the region. Their efforts complement those of the U.S. staff, who carry on the research mission while temporarily relocated to NMRC.

Several of those U.S. researchers continue ongoing projects. For example, Lt. DiClaro recently completed a site visit to Liberia and is currently in Ghana. Lt. Cmdr. Self went to Camp Lemonnier in Djibouti for two weeks on the TREAT TD study. Our senior enlisted leader, HMC Inda, is currently in Djibouti as well. Lt. Adams recently reported as the head of the NAMRU-3 Detachment in Ghana to continue research there.

I am very proud to command a staff that has proven its willingness to carry out our mission of infectious disease research under difficult conditions. We look forward to the speedy return of all our U.S. staff to Egypt. In the meantime, NAMRU-3's Egyptian LES are carrying out the mission in coordination with the evacuated staff in the U.S.

NAMRU-3 Commanding Officer sends,  
Buhari A. Oyofe, CAPT, MSC, USN



## New Consortium on the Health and Readiness of Servicewomen

From NHRC Public Affairs

SAN DIEGO - Researchers at the Naval Health Research Center (NHRC) recently founded the Consortium on the Health and Readiness of Servicewomen (CHARS). Over the past 30 years, NHRC researchers created a strong and diverse portfolio on gender-related issues. Past projects addressed aspects of service-women's experiences, including issues related to the integration of women into previously closed occupational ratings on ships and submarines; military sexual assault perpetration and victimization; gender-specific physical health issues; and gender differences in occupational environments such as work-related



*Chief Engineman Patricia Cooper, a student in the Riverine Combat Skills course (RCS), patrols the training grounds during a field training exercise in Camp Lejeune, N.C. This class is the first RCS training group composed of Coastal Riverine Force (CORIVFOR) Sailors and the first to incorporate women into the course. Photo by Mass Communication Specialist Seaman Heather M. Paape.*



*Hospital Corpsman 3rd Class Heidi Dean, left, and interpreter Khatira Fazli, both assigned to the Female Engagement Team of 3rd Battalion, 5th Marine Regiment, Regimental Combat Team 2, teach a health class to Afghan women during a health initiative. The battalion conducts counter insurgency operations in partnership with the International Security Assistance Forces (ISAF) in Afghanistan. Photo by Lance Cpl. Dexter S. Saulisbury.*

injuries, fitness standards, musculoskeletal injury, and mental health outcomes following combat exposure.

CHARS includes more than 30 research scientists spanning several departments at NHRC as well academic, government and private sector institutions. The researchers affiliated with CHARS bring to bear a broad range of disciplinary perspectives, including public health and epidemiology; clinical, social, quantitative, physiological and neurocognitive psychology; nursing and medicine; family studies; and political science.

The founding of CHARS is particularly timely given military policy changes in the spring and summer of 2013 that are likely to significantly affect servicewomen and their families. These include the end of the direct ground combat exclusion for women, the repeal of "Don't Ask, Don't Tell," and the extension of spousal and family benefits to same-sex married partners. In addition,

there has been increasing national attention concerning military sexual assault, a problem that disproportionately affects female service members. These developments highlight the need for an organization such as CHARS to augment the existing research infrastructure to better support and sustain gender-focused military research.

CHARS joins the ranks of a number of important military research groups that focus on servicewomen. These include the Military Women's Health Research Interest Group, the Women's Health Task Force, the Defense Department Advisory Committee on Women in the Services, and the Defense Women's Health Research Program. CHARS is distinct from these existing groups because of the focus on conducting empirical research to enhance the health and performance of military women.

For more information about CHARS, contact [nhrc-info@med.navy.mil](mailto:nhrc-info@med.navy.mil).

# Naval Medical Research Unit Dayton Change of Command Ceremony

*From NAMRU-Dayton Public Affairs*

DAYTON, Ohio – The Naval Medical Research Unit Dayton ([NAMRU-Dayton](#)) change of command ceremony was held August 22 at Wright-Patterson Air Force Base. Capt. Doug Forcino, the outgoing commanding officer, turned the command over to Capt. Jeffrey Andrews, previously the executive officer.

The ceremony's presiding officer and guest speaker, Capt. John Sanders, commanding officer of the Naval Medical Research Center (NMRC), applauded Forcino for his outstanding leadership and overall tour of duty while in command of NAMRU-Dayton. Forcino will fill his new role representing the Navy at the Army's Medical Research and Development Headquarters and managing the Army's Military Operational Medicine Research Program as well as the joint Military Operational Medicine Research Program, which is funded by the Defense Health Program.

Sanders presented the Legion of Merit award to Forcino, saying, "Capt. Forcino's superb leadership and vision were critical to the growth of new state-of-the-science capabilities and world-class laboratory facilities in support of our joint warfighters."

Upon receiving the award, Forcino said, "I love NAMRU-Dayton, the people who work here, and my job. But in this business, change is the only constant, and my obligation is to go where the Navy needs me to go." He also acknowledged the service and sacrifice of military spouses, saying that "being a military spouse is the toughest job in the military – and that applies equally to Navy, Marine Corps, Army and Air Force spouses."

Forcino thanked the wardroom, government civilians and contract staff of NAMRU-Dayton. "Together, we faced some rather extraordinary challenges," he said, adding that "in spite of these challenges, you have maintained a focus on the mission of NAMRU-Dayton and have even expanded our capabilities to serve the needs of the joint warfighter." He identified each science di-



*Capt. Jeffrey Andrews, the new NAMRU-Dayton commanding officer (right), presents a binnacle to Capt. Doug Forcino (left), the outgoing CO.*

rectorate for their "truly remarkable" dedication to the NAMRU-Dayton mission.

As Andrews assumed command of NAMRU-Dayton, saying, "I am honored and privileged to be given the opportunity to lead you," he thanked Forcino for "the wise counsel and the many lessons learned...[his] constant guidance, support, and friendship."

Since NAMRU-Dayton's activation, October 6, 2010, the command has experienced a good deal of leadership changeover due to decisions made in the nation's 2005 Base Realignment and Closure round. The two Navy medical R&D laboratories that merged to form NAMRU-Dayton have "succeeded in making an organization where the whole is greater than the sum of its parts," according to Forcino.

Following his speech, Andrews presented Forcino with a binnacle. The Master of Ceremonies and current NAMRU-Dayton executive officer, Cmdr. Michael Reddix, explained the history of the unique compass, saying, "It protected the ship's compass...had

an oil lamp to enable the helmsman to check his course at night. You may have heard of the term 'binnacle list,' which gets its name from the old nautical practice of the ship's surgeon tacking the stick on the binnacle each morning so the captain could and get an idea of the health of his crew; very important, especially for a warship that needed every able-bodied sailor to man the decks in battle."

Prior to the departure of the official party and the boatswain piping the side boys, Andrews said, "Remember and know that each of you makes a difference and your efforts impact operational readiness of our joint warfighters. I challenge you to stay focused, keep motivated, and continue to climb and maintain the NAMRU-Dayton tradition of excellence!"

To learn more about NAMRU Dayton, visit their website at <http://www.med.navy.mil/sites/nmrc/Pages/namrud.htm> or their Facebook page at <https://www.facebook.com/pages/Naval-Medical-Research-Unit-Dayton/460131294047899?ref=hl>.



## U.S./UK Undersea Medicine Exchange Brings Researcher to Sub Lab

*From NSMRL Public Affairs*

GROTON, Conn. - When asked by the Royal Navy Medical Appointer if he was interested in becoming the United Kingdom (UK) exchange medical officer at the Navy Submarine Medical Research Laboratory (NSMRL), Surgeon Commander John Clarke reports, "It took roughly a millisecond to respond in the affirmative. I joined the Royal Navy with the intention to broaden my experience and travel as widely as possible, so the offer of an opportunity to live and work in the USA was an easy choice."

The U.S./UK Undersea Medicine exchange program, which has been in place since 1967, brings mutual benefits to the U.S. and Royal Navies through collaboration and efficient sharing of information and resources. Program incumbents generally have a background in diving or submarine medicine. For example, Clarke's first post was as the medical officer on HMS Challenger, the Royal Navy's seabed operations vessel with the capacity for saturation diving and support of a disabled submarine through the delivery of a submarine escape vessel. For that role, Clarke trained at the Institute of Naval Medicine (INM) in diving medicine. Training included the Royal Navy Ship's Diving Officer's Course and work as the duty diving medical officer at a time when the diving medicine department was still at the forefront of diving research.

He continued to treat decompression illness as a general practitioner in a variety of postings and returned to the INM in 2008 for training as an occupational health practitioner to serving personnel including professional divers. During that training, he also undertook research into hearing loss from exposure to noise on operational deployments to Afghanistan in the Royal Marines and is interested in the success of returning injured servicemen to their principal employment.

Clarke hopes to bring his background in diving and occupational health to the practical application of research during his time in Groton. His



*Surgeon Commander John Clarke of the UK Royal Navy is currently serving at NSMRL as an exchange medical officer.*

knowledge of similar systems in the UK will bring a different perspective in research into such areas as submarine escape and rescue, submarine atmosphere control, and diving. He is also interested in the practical impact of noise and hearing loss on sailors and soldiers and how it can be controlled or mitigated while retaining those who are fit for their role.

Regardless of where his research develops during the exchange, Clarke will "endeavor to ensure that the exchange continues to be appreciated so that future generations of undersea

medical officers can look forward to this opportunity."

Clarke's counterpart in the U.S. Navy is a qualified undersea medical officer employed in the Undersea Medical Department at INM, where he is responsible for undersea medicine training, diver medic training, and submarine escape tower training. He is also on call for diving advice and disabled submarine or other emergencies. The INM is located in Portsmouth, which affords easy access to London, France by ferry, and Europe by air or train.



## Rear Adm. Terry Moulton Tours Naval Health Research Center

*By Lt. Seth Reine, NHRC Warfighter Performance Department*

SAN DIEGO - Rear. Adm. Terry Moulton, deputy chief, Medical Operations and director, Medical Service Corps, Bureau of Medicine and Surgery, visited the Naval Health Research Center (NHRC) August 1. NHRC's commanding officer, Capt. Jacqueline D. Rychnovsky, and her leadership team provided an overview of how NHRC directs current research toward the critical needs and concerns of the fleet and warfighter mission.

In the Operational Infectious Diseases Department, Cmdr. Gary Brice, Lt. Cmdr. Kellie McMullen, and Lt. j.g. Brenda White briefed Moulton on NHRC's discovery of the pandemic

influenza in 2009 through the lab's extensive surveillance networks and highlighted their role at the forefront of global health security for respiratory and enteric diseases.

In the Warfighter Performance Department, Cmdr. Thomas Herzig discussed the direct impact the department has throughout the warfighter cycle.

"From training and building resiliency during deployment work-ups, to optimizing performance in theatre, to rehabilitating and resetting warfighters post-deployment, the Warfighter Performance department at NHRC does it all," Herzig explained.

A specific research capability highlighted by Lt. Cmdr. Jose Dominguez and Lt. Seth Reini within

the Warfighter Performance Laboratory was the Physical and Cognitive Operational Research Environment (PhyCORE). The PhyCORE is a cutting-edge, immersive virtual reality rehabilitation and research platform to enhance rehabilitation strategies for wounded warriors and optimize the performance of healthy warfighters within their various operational environments.

After the tour, Moulton said, "This visit has really been helpful in gaining a greater appreciation of the important research that goes on here at NHRC. I've come away with not only an appreciation of the commitment of the staff, but also just how much they know about their projects and how they support the Navy and DoD medical mission."



*Rear Adm. Terry Moulton, deputy chief, Medical Operations and director, Medical Service Corps, Bureau of Medicine and Surgery, visited the Naval Health Research Center August 1.*

# Techniques for Spatial Disorientation Countermeasures Training

By Dr. Frederick Patterson and Dr. Henry Williams

DAYTON, Ohio - Aviation spatial disorientation (SD) is best described as a pilot's inability to correctly interpret aircraft attitude, altitude or air-speed in relation to the earth or other points of reference. If not recognized immediately, this sensory misperception can lead to controlled flight into the ground, midair collision, or inappropriate control inputs resulting in a serious mishap. The ubiquity of this problem has been well documented by mishap reports and surveys that indicate virtually all pilots experience some form of SD during their careers, and SD is the leading cause of Class A mishaps in Naval Aviation.

Although many of the past explanations for SD have concentrated on isolated vestibular illusions as primary causal factors, the growing consensus among SD researchers is that disorientation in the cockpit is most likely generated from conflicting visual and vestibular cues that confound cognitive processing of pilot spatial strategies. This revised interpretation of causal factors has helped researchers at the Naval Medical Research Unit Dayton ([NAMRU-Dayton](#)) to identify and classify common SD events, which has further led to the specification of vestibular, cognitive and visual components of SD (depicted in the graphic chart below).

To help pilots recognize and avoid

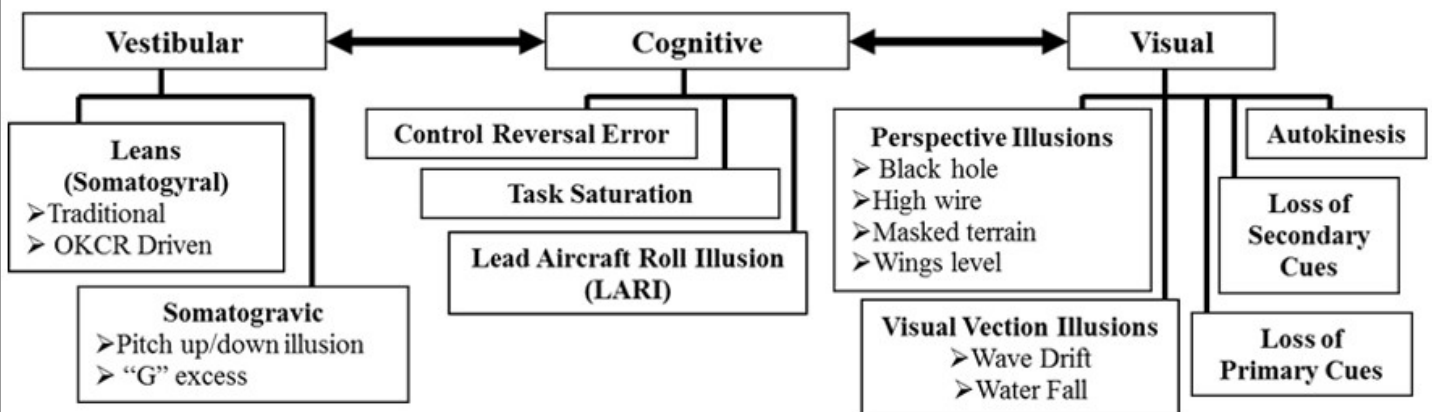


*Spatial Disorientation Dome at the NAMRU-Dayton Spatial Disorientation Laboratory.*

SD, NAMRU-Dayton is currently generating SD training countermeasures that incorporate emerging concepts gathered from recent mishap analysis, physiological incident reports and ongoing aeromedical research. This work is being funded by Naval Air Systems Command PMA-205 (Aviation Training Systems). Using low-cost simulators, flight scenarios are being designed, tested and validated as training tools to teach flightcrew members how to recognize, cope with and recover from the most prevalent

forms of SD. This work is unique in that it increases the emphasis on how pilots use, or sometimes mis-use, spatial cues such as the natural horizon, the artificial horizon instrument, and aircraft structure reference points (e.g., the canopy bow or the top of the glare shield). This work is also studying how pilots develop spatial strategies that incorporate these spatial cues and how we might be able to create training scenarios that promote better spatial strategy development and application.

## Spatial Disorientation Components





## NMRC Researcher Speaks at National Institute of Standards and Technology

SILVER SPRING, Md. - A researcher from the Naval Medical Research Center (NMRC) spoke at a seminar at the National Institute of Standards and Technology in Gaithersburg, Md. September 11. Dr. Kimberly Bishop-Lilly, deputy head of the Genomics Department in NMRC's Biological Defense Research Directorate (BDRD), discussed the applications and limitations of high-throughput genotypic and phenotypic strategies for microbial identification and characterizations.

Recent technological advances in the fields of high-throughput genomics and phenomics allow for the relatively rapid production of massive and complex datasets. These technologies hold promise for diverse applications such as forensics, food safety and clinical diagnostics. Despite rapid advancements, significant barriers still remain, including lack of standards and the bioinformatic burden associated with analysis of very large datasets.

"We will present our research efforts to the Biosystems and Biomaterials Division of the Materials Measurement Laboratory at NIST," Bishop-Lilly said before the seminar. She added that she would describe the team's efforts to develop empirical limits of detection (LoD) for



*The BDRD Genomics research team working on applications and limitations of high-throughput genotypic and phenotypic strategies for microbial identification and characterizations. From left: Dr. Kim Bishop-Lilly, Cassie Redden, Truong Luu and Dr. Kenneth Frey.*

development efforts at BDRD. "These efforts are aimed at lowering the barrier to bioinformatic analysis of large genotypic and phenotypic datasets through open source as well as very directed software develop-

including LoD experiments, are a necessary first step toward full realization of the potential inherent to these high-throughput technologies. Before technologies like these can be used in a routine manner for clinical diagnostics or other microbial detection applications, there is a necessity for rigorous studies to further characterize the various platforms' characteristics in terms of sensitivity, reproducibility and bias.

BDRD, located at Ft. Detrick in Frederick, Md., is recognized as a world leader in detection and confirmatory analysis of bio-threat agents. Researchers there have made major strides in genomics, bioinformatics and bacteriophage research. They have undertaken a large-scale high throughput genomics effort in sequencing all agents closely related to classic bio-threat agents. The laboratory has the latest sequencing technology capable of sequencing over 100 bacterial genomes per year.

***"These efforts are aimed at lowering the barrier to bioinformatic analysis of large genotypic and phenotypic datasets through open source as well as very directed software development efforts." Further development of analysis software will help facilitate adoption of the next generation sequencing and phenomic technologies in the clinic and elsewhere.***

microbial pathogens in clinical specimens and environmental samples in a cross-platform comparison of commercially available sequencers using artificial metagenomes of known content and would also discuss some related software

ment efforts." Further development of analysis software will help facilitate adoption of the next generation sequencing and phenomic technologies in the clinic and elsewhere.

Bishop-Lilly said that these efforts,



## Medical Experts Emphasize Investment in Acute Trauma Care

By Ellen Crown, Army Medicine

FORT LAUDERDALE, Fla. - From battlefield blasts to plane crashes, major advancements in acute trauma care are being seen in both the military and civilian health sectors, agreed experts during roundtable discussion at the 2013 Military Health System Research Symposium, August 13.

Funding in research and rapid implementation of best practices are paying off, and people with serious injuries are surviving and rehabilitating, said director of the U.S. Army's Combat Casualty Care Research Program (CCCRP) Col. Dallas Hack. Joining him was Air Force Col. Todd Rasmussen, CCCRP deputy director.

Roundtable participants included Navy Capt. Eric Elster, Uniformed Services University School of Medicine, Department to Surgery; Air Force Col. Jeffrey Bailey, Joint Trauma System director; and Dr. Margaret Knudson, chief of surgery at the San Francisco General Hospital and Trauma Center.

Bailey, who joined the event via phone from Afghani-  
(Continued on page 11)



U.S. Army Col. Dallas Hack (right), director of the U.S. Army's Combat Casualty Care Research Program; U.S. Air Force Col. Todd Rasmussen, deputy director of Combat Casualty Care Research Program (middle); and Navy Capt. Eric Elster, Uniformed Services University School of Medicine, Department of Surgery (left).

## A Tribute: Purnomo Projodipuro, 1934-2013

SILVER SPRING, Md. - Purnomo Projodipuro began work as a medical parasitologist at the U.S. Naval Medical Research Unit No. 2 (NAMRU-2), Jakarta Detachment in 1972 and retired in 2007 after 35 years of uninterrupted service to that laboratory. Practitioners taught by Purnomo overwhelmingly populate the parasitology and tropical medicine landscape of Indonesia today and include an entire generation of U.S. Naval officers who studied in the field of malaria and spent time stationed at NAMRU-2 in Jakarta.

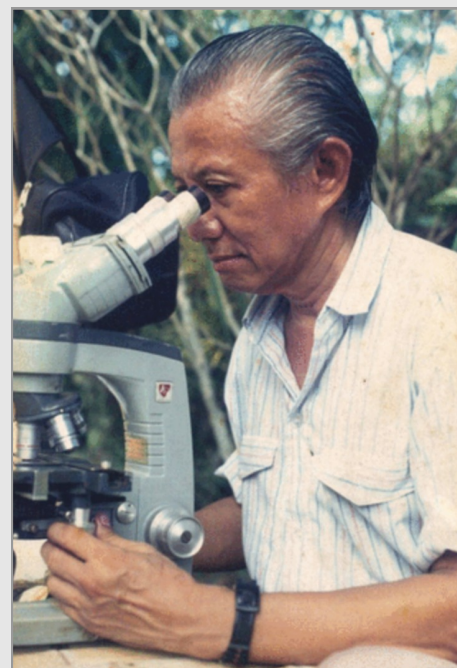
Late one evening at the microscope, a visibly fatigued researcher received mentoring from Purnomo, who held up a randomly chosen slide from his bench and wordlessly insisted that it be examined. In a firm but nearly whispered calm voice, Purnomo said, "Do not think of this as an object or a task. It is the health of someone's son or daughter, mother or father. Never allow yourself to become tired doing this work. Quit and rest before that

happens." For Purnomo, the professional expectations of the microscopist and the accomplishment of the research product were irrelevant when measured against the human whose fate lay within the stained blood smear and its proper examination.

Purnomo tirelessly and passionately instructed many hundreds of students in parasitology at no less than seven prominent medical schools in Jakarta (Trisakti University, University of Tarumanegara, Christian University of Indonesia, Atmajaya Catholic University, University of Indonesia, and others) over more than 40 years.

Purnomo's many research accomplishments, over 150 papers in journals of parasitology and medicine, were formally acknowledged in 1994 by the Helminthological Society of Washington, D.C., which bestowed an honorary membership in a ceremony at the Uniformed Services University of the Health Sciences, Bethesda, Md.

Purnomo spent his last years in



Purnomo Projodipuro

the loving care and kindness of his devoted family. He died peacefully at his home, May 10. The very many students, colleagues and friends of Purnomo will miss his stirring humanity and extraordinary devotion to his technical pursuits.

# Dayton Studies Color Vision Deficiency for Special Duty Occupations

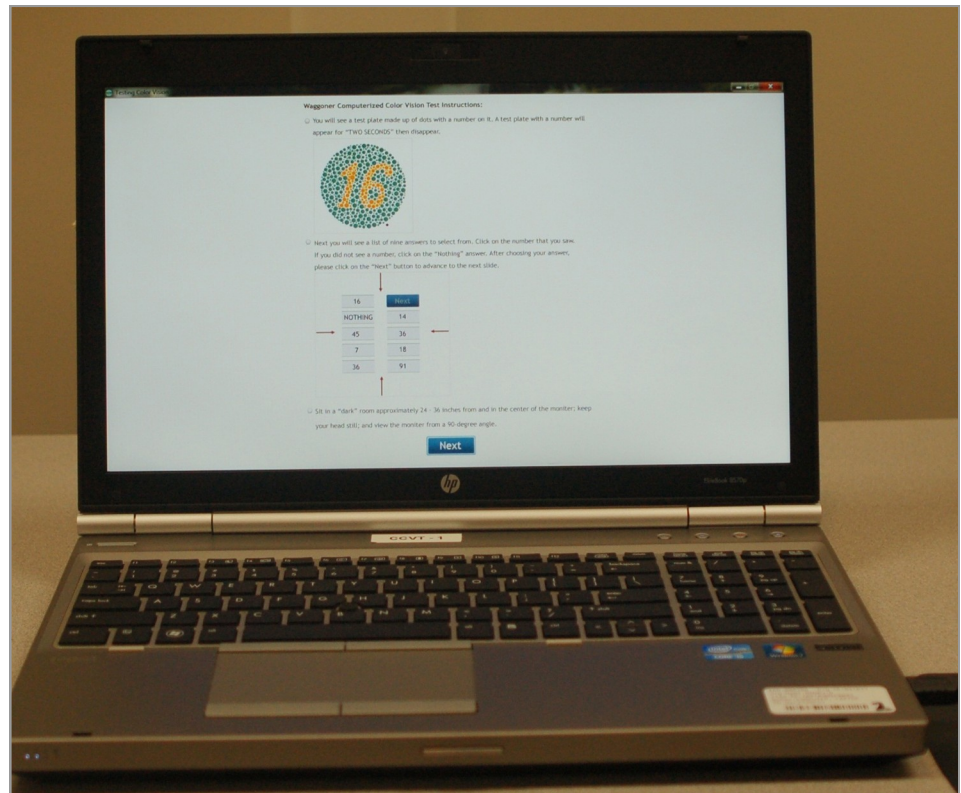
By Dr. Cristina Kirkendall



DAYTON, Ohio - Researchers at the Naval Medical Research Unit Dayton ([NAMRU-Dayton](http://www.namru-dayton.org)) have undertaken a study

to evaluate new computer-based color vision tests in the hopes that they will provide better assessment of both the type and severity of a color vision deficiency (CVD) compared to older technology.

The U.S. Navy currently uses two color vision tests, the Ishihara pseudoisochromatic plates and OPTEC-900 lantern test. Both tests are capable of identifying but not quantifying red/green CVDs. One may expect both type and severity of CVD to affect human performance in color-rich environments that require military operators to accurately perceive color-coded information (e.g., color-coded icons that represent friendly vs. hostile entities in a battle space). Newer computer-based color-vision tests (i.e., Cone Contrast Test, Waggoner Computer Color Vision Test, and Colour Assessment and Diagnosis Test) provide data that relate to both the type and the degree of severity of CVD. These advanced tests facilitate development of CVD standards and provide the aeromedical clinician with methods to better



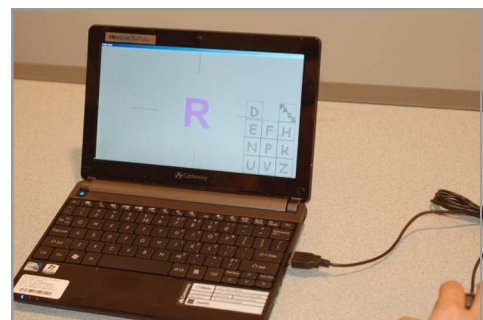
*Waggoner Computer Color Vision Test.*

assess the suitability of a special-duty candidate to operate in environments that require fast and accurate color discrimination (e.g., aviation cockpits, radar stations, combat control systems).

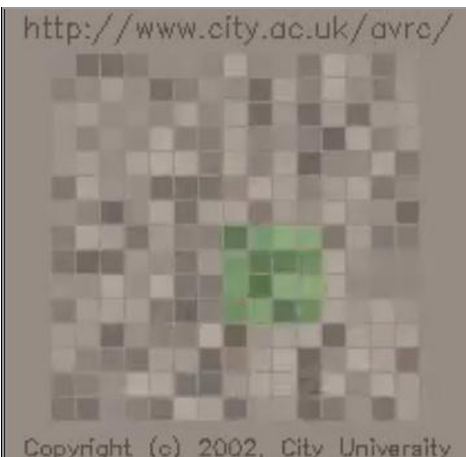
A U.S. Bureau of Medicine and Surgery (BUMED) sponsored NAMRU-Dayton research project titled "Assessment of Color Vision Screening Tests for Special Duty Occupations" has three objectives: first, to evaluate the two current color vision tests along with the three computer-based tests and determine their sensitivity and specificity with respect to detecting both type and severity of CVDs; second, to assess the degree to which each test predicts normal and color-defective human performance in operationally relevant in- and out-of-aircraft cockpit tasks; and third, to provide an evaluation summary to BUMED regarding the capabilities of computer-based color-vision diagnostic tools in the screen-

ing and selection of special-duty candidates, including aviation.

Phase 1 of data collection began at the U.S. Air Force Academy in February and concluded in May. Phase 2 of data collection began in July and will conclude in November. This second phase of data collection again utilizes Air Force Academy participants and also includes participants at the Naval Aerospace Medical Institute, Naval Air Station, Pensacola.



*Cone Contrast Test.*



*Diagnosis Test.*



## NRL Scientists Fight Antibiotic-Resistant Diseases at NAMRU-2

(Continued from page 1)

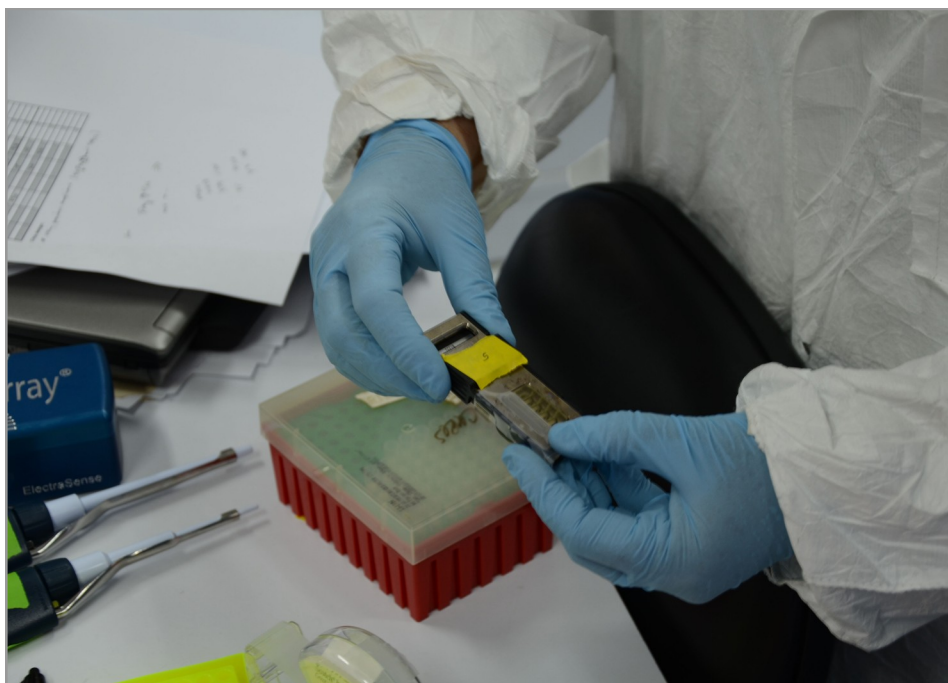
Relatively small and speedy, the ARDM can simultaneously detect hundreds of pathogens, the agents that cause disease, with just one-day turnaround time.

The data generated from the ARDM tests indicated a widespread distribution of genes causing resistance to both first- and last-line antibiotics within this region, according to Taitt. She noted that it was interesting to learn that the types and levels of multidrug resistance in Phnom Penh were found to be different from those of similar bacterial pathogens tested from the Middle East, South America, and North and West Africa.

The array is the size of a microscope slide and the reader is the size of a brick. Other readers are typically the size of a standard microwave oven, so the NRL-developed ARDM offers a tremendous savings in size and speed.

The data collected using the ARDM is critical in steering medical personnel toward strategies with the highest chances of success when treating sailors and soldiers deployed to these regions. This knowledge also will enable epidemiologists to track the spread of new and emerging sources of resistance while also providing guidance for public health and antimicrobial administration policies for more timely response to infectious disease outbreaks.

The testing that NRL and NAMRU-2 conducted in Cambodia



*The NRL-developed Antimicrobial Resistance Determinant Microarray can simultaneously detect hundreds of antibiotic resistance genes from pathogenic bacteria. Photo by Lt. Cmdr. Michael Prouty.*

resulted in the first molecular epidemiological characterization of antibiotic resistance genes and resistance trends from bacterial enteric pathogens in Cambodia and also contributed to an expanding database of global antibiotic resistance gene signatures. Using the ARDM to study antibiotic resistance in different regions, NRL researchers have made the surprising discovery that there are geographic difference in the resistance genes and that some of these

genes could be resistant to entire classes of antibiotics. Armed with the ARDM, researchers can now help to provide the military with knowledge that helps them defend against diseases they might encounter around the world.

NAMRU-2 supports American interests in the Pacific Theater by studying infectious diseases of critical public health and military importance to the United States and other regional partners.

## Medical Experts Emphasize Investment in Acute Trauma Care

(Continued from page 9)

stan, talked about some of the technologies, tools and education implemented over the past decade of war, including battlefield tourniquets, hemostat bandages to reduce blood loss and education on first-aid care. Bailey added that it is now time to focus on the gaps.

"The greatest burden of death is not in the hospital; it is on the battlefield. We have the greatest

opportunity to make a difference in pre-hospital care," Bailey said to the group.

It was a point with which non-military doctors agreed. Knudson joined the group to share her recent experiences caring for victims during the San Francisco plane crash in July. Fifty-three of the plane crash patients were treated at San Francisco General.

Knudson explained that she had

previously trained with military health care combat casualty teams and described how she used that training during the mass casualty triage.

"We need to keep these collaborations going because it brings a value to both the military and the civilian sectors," said Knudson.

Elster added, "It's how we train the next generation."



## NMRC Display Salutes NAMRU-3

SILVER SPRING, MD.—At the Naval Medical Research Center (NMRC), our display case features the Naval Medical Research Unit No. 3, Cairo (NAMRU-3). The poster highlights some of the research that is being done there along with pictures of the commanding officer, Capt. Buhari Oyofa, and other staff assigned there. Standing near the poster is Lt. Cmdr. Jennifer Curry, the acting officer-in-charge, and HM1 (FMF) Daniel Hernandez. Since the evacuation, the NAMRU-3 staff continues to be engaged in ongoing research in order to carry out their mission.

## Greetings from the NMRC Ombudsman!

September is Suicide Prevention Month, and I'd like to dedicate this month's Ombudsman article to the topic. Stress, as we all know, is an unavoidable part of life and there are aspects to military life that are particularly stressful, such as deployments and frequent moves. How you manage stress can impact your quality of life and the lives of those around you. This is especially true when the stress of life leads someone to contemplate suicide.

Suicide is a major public health problem. There are more than 30,000 suicide deaths each year in the United States, and an estimated 11 attempted suicides occur per every suicide death. Therefore, more than 300,000 suicide attempts are estimated to occur each year. In the military alone, there were 349 suicides last year, 60 of which happened in our Navy. A single suicide in our Navy is too many, 60 is more than tragic. This is the bad news. The good news is that all suicide deaths are preventable! Take the time today to know what you can do to combat this public health crisis.

The first thing to you can do is to familiarize yourself with the warning signs of suicide and its risk factors to help identify, prevent and intervene early to save lives. Think of the word SUICIDE as an acronym for signs often associated with suicidal behavior: **(S)**uicidal Talk, **(U)**tter Hopelessness, **(I)**solation, **(C)**lose Relationship Loss, Further **(I)**solation, **(D)**epression, **(E)**thanol (aka alcohol use). If you've identified someone that you think is at risk of attempting suicide, be prepared and look to the acronym ACT (**A**sk-**C**are-**T**reat) for how to respond! If you think someone is contemplating suicide, ASK if they are thinking about suicide, let them know you CARE, and get them assistance (TREAT) as soon as possible! Also, once you've engaged the person you think may be suicidal, do not leave the person alone!

Finally, if you or someone you know is considering suicide, resources are available! If you or someone you know is in immediate danger, call 911. If you or someone you know is contemplating suicide, seek assistance immediately by contacting the National Suicide Prevention Lifeline at 1-800-273-8255. In addition, the following resources can be used when trying to help someone in crisis:

Veterans Crisis Line: 1-800-273-8255 Press 1 or go to <http://www.veteranscrisisline.net/?gclid=CJns88auo7kCFUmi4AodXzIAsA>

National Suicide Prevention Line: <http://www.suicidepreventionlifeline.org/gethelp>

United States National Suicide and Crisis Hotlines: <http://suicidehotlines.com/national.html>

These lines are open 24/7. Do your part to stem this terrible epidemic! Remember, suicide is preventable.

As always, if you are in search of other resources or assistance, please don't hesitate to contact me. I can be reached by phone at 301-233-9789 or by email at [NMRC.Ombudsman@gmail.com](mailto:NMRC.Ombudsman@gmail.com).

Have a Fine Navy Day!  
Alexandra Mora, NMRC Ombudsman